Environmental sustainability adoption

An application and extension of the Theory of Planned Behaviour to the adoption of environmentally sustainable products.

Master Thesis

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Abstract

Environmentally sustainable businesses and products are necessary to deal with increasing environmental problems. In order to market this category, the drivers for adoption need to be investigated. Current research has not yet focused on the consumer perspective for sustainability adoption. This study fills this gap with the application of the Theory of Planned Behaviour onto the context of environmental sustainability. A web-based self-administered survey amongst 257 respondents is used to test a total of eight hypotheses on intention to adopt and adoption. Environmental concern, previous purchase behaviour, willingness to pay more and perceived convenience are found to be the main drivers for sustainability adoption. Results further indicate that environmental knowledge, social pressure and herd behaviour are not found to be significant contributors to intention to adopt environmental sustainability. Scientific contributions and managerial implications are discussed, followed by the limitations and recommendations for future research.

Key words: Environmental Sustainability, Sustainability, Theory of Planned Behaviour, Adoption Behaviour, Product Adoption

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Chapter one. Introduction

Human influence on the environment is causing an increase in environmental issues year after year. The world is facing issues such as global warming, depletion of the ozone layer, loss of biodiversity, conflicts over, and depletion of natural resources, and air-, water- and soil pollution. These issues drastically influence all human life and have an impact on the life quality of future generations (Osbaldiston & Schott, 2012; van der Leeuw, Wiek, Harlow, & Buizer, 2012; Vlek & Steg, 2007). The environmental problems are partially caused by the disproportionate, and increasing, extraction of natural resources ,and increased energy consumption which dates back to the industrial revolution in the early 1800's (Steffen, Crutzen, & McNeill, 2007; van der Leeuw et al., 2012). Historically, companies strived to gain competitive advantage by producing more, reducing costs, or through differentiation (Porter, 2008). However, the aforementioned problems in today's global environment have forced businesses to radically re-think their strategies, consider their ethical obligation to the community, and realize the urgency of sustainability (Crane & Matten, 2010; Hart, 2010; Kotler, 2011).

Van der Leeuw et al. (2012) argue that the problems have their roots in human behaviour and institutional structures, and we must aim to comprehend the system drivers and the underlying causes. The prudence of understanding what drives consumers, and what spurs environmental decision making is also emphasized by Vlek and Steg (2007) and Kotler (2011). This study aims to find out the underlying motivational factors of sustainability adoption. Environmental sustainability research, which is a subgroup of sustainability as a whole, has covered several areas in the past. Research at the early stages has mainly focused on the exploration of environmental sustainability (Goodland, 1995), and later the necessity of a transition towards sustainability (Lovins, Lovins, & Hawken, 1999). Moreover, research has

focused on system changes of the society as a whole from a macro-economic perspective (Geels & Schot, 2007). A large portion of sustainability research has been conducted from a company perspective. It has been researched how environmental sustainability can influence the company's performance and profitability (Russo & Fouts, 1997), but also how companies are able to make the transition to sustainability (Boons & Lüdeke-Freund, 2013; Kemp, 1994). Going back to the claim by Van der Leeuw et al. (2012), and Vlek and Steg (2007), the neglected consumer perspective and underlying motivational factor exposes the gap which this study fills. The gap is properly formulated by Kotler (2011), who poses the question: "*What factors lead consumers to give more weight to sustainability?"* (Kotler, 2011, p. 135). Based upon foregoing information the research question can be formulated as follows: *"What drives the adoption of environmentally sustainable businesses or products?"*

This study investigates the factors influencing the adoption of sustainable products and businesses and does so by applying and extending the Theory of Planned Behaviour (TPB) to the context of sustainability. The TPB focuses on behavioural attitudes, normative beliefs, and perceived behavioural control (Ajzen, 1991). In this study the TPB is extended with moral obligation, which has been an accurate additional predictor of behavioural intentions in other contexts (Beck & Ajzen, 1991). The outcomes of this study will give a clear insight into the consumer's perspective. It will show which concepts cause the actual behavioural act of adoption. Based on earlier research on sustainability adoption in different contexts, the hypothesized drivers in this study are environmental concern, environmental knowledge (behavioural attitudes), social pressure, herd behaviour (normative beliefs), previous purchase decisions, willingness to pay more, (perceived) convenience (perceived behavioural control), and environmental guilt (moral obligation) which will be explained throughout this study.

Chapter two. Theoretical framework

The current chapter will be the theoretical framework of the study, which will serve as a basis for the research on the drivers of the adoption of environmentally sustainable business models or products. In order to understand what drives this adoption, it is important to get a clear definition of the key constructs with regards to the matter. Not only will this literature study focus on the fundamentals of environmental sustainability, it will moreover focus on adoption behaviour models, which is the foundation of the hypothesis development, following in chapter three.

2.1 Antecedents of environmental sustainability

The awareness that businesses have to play an important role to their environment is a topic which has been a point of debate for decades. (Corporate) Social Responsibilities were already mentioned early on in literature and the book *Social Responsibilities of the Businessman.* In this book, Bowen (1953) considered the obligations of companies related to their power in society. This description is nowadays considered to be the origin of the discussion on Corporate Social Responsibilities (CSR) (Carroll, 1999). From here on, the understanding of business responsibilities developed more and more. For example Frederick (1960), described the responsibilities of businesses as something that enhances total socio-economic welfare, rather than simply the interests of private persons and firms. The definition of CSR developed throughout the years, which eventually resulted into the extended, more comprehensive definition as proposed by the World Business Council for Sustainable development. This council defined CSR as '*CSR is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large.'* (WBCSD, 1999, p.3).

Also commitment from firms to CSR is something which has increased throughout the decades and has been acknowledged as being essential for businesses to prevail in today´s global economy (Kanji & Chopra, 2010). Research in 1973 already showed that amongst 96 investigated US companies, all of them were involved in some sort of social responsibility practice (Eilbirt & Parket, 1973). However, what this research does not demonstrate is the underlying motivations for CSR. Underlying motivations can both be altruistic and strategic, which respectively is the difference between engaging in CSR with the willingness to sacrifice profits for social reasons, and the strategic approach which has profit maximization as a main goal (Fernández-Kranz & Santaló, 2010).

2.2 Environmental sustainability

The scope of CSR can surface through multiple forms such as on the workplace, marketplace, environment, community, ethics, and human rights. The form of CSR which a business pursues, usually depends upon the economic perspective which the business has (Moir, 2001). However, regardless of the complex nature of the concept of CSR, environmental sustainability appears to be generally accepted as an integral element of CSR (Orlitzky, Siegel, & Waldman, 2011). In this study the focus will be on environmental sustainability rather than other forms of CSR due to its urgent nature.

One could argue that environmental sustainability is crucial in current and future businesses due to the fact that human activity influenced the environment and the biosphere drastically in the past decades. The human influence caused, and is causing, a destruction of-and a shift in ecosystems which is amongst other reason caused by an increased fossil fuel consumption (Lovins et al., 1999; Scheffer, Carpenter, Foley, Folke, & Walker, 2001). Businesses and society face multiple environmental challenges such as: an (irreversible) atmospheric and subsequently environmental change (probably irreversible), ozone layer

depletion, soil degradation and increased desertification, air and water pollution, fresh water scarcity and a general depletion of physical and natural resources (Scott, 2005, as cited in Kotler, 2011).

Environmental sustainability can be defined as '*the maintenance of natural capital*,' and can be classified into three different categories. The first category is on the output side, which is about maintaining waste emissions within the capacity of the local environment. Secondly, there is the input side, which is about harvesting renewable resources and minimizing non-renewable resources solely to the point where they are used to pursue renewable resources. Thirdly, the concept exists of several operating principles which discuss the scale of the human economic subsystem. This subsystem should be limited to a level that is at least within the carrying capacity and therefore sustainable. Also technological progress for sustainable development should be efficiency-increasing and renewable resources should be exploited on a profit-optimizing, sustained-yield, and fully sustainable basis (Goodland, 1995).

2.3 Environmentally sustainable business models and products

Aforementioned challenges cause the necessity for business models that aim at environmental sustainability. Lovins et al. (1999) proposed a so called 'road map for natural capitalism', already more than a decade ago. This natural capitalism consists of four changes which the author claims to be important in the ongoing environmental changes. First of all the productivity of natural resources should be increased. Secondly, production models should become biologically inspired, followed by thirdly the search for a solutions-based business model. Finally, there should be reinvested in natural capital. These four guidelines are, according to the authors, integrating both ecological and economical goals of companies, since they are good for the environment and at the same time profitable (Lovins et al., 1999). For the purpose of this study, when a company actively contributes to at least one of these categories, they are considered environmentally

sustainable (or environmental-friendly). In addition, when the product is produced with one of the categories in mind, it is considered as an environmentally sustainable product. From a marketing perspective, businesses will most definitely lose their competitive edge if they do not rethink their business models and adapt to the sustainability movement (Kotler, 2011). In line and building upon the idea of business model change, Boons and Lüdeke-Freund (2013) consider just a change not as an end, but argue that it is more a mediator to sustainable innovations meaning that in fact companies with a sustainable vision and philosophy are key to move forward to greater sustainability of our society as a whole.

Thus, consensus seems to exist throughout the literature that there is an increasing need for companies to make a transition to environmentally sustainable business models. The importance and necessity is there, yet not every company is pursuing such a strategy as of yet. A possible explanation for this might be that first of all companies are still aiming for an unreasonable strong growth rather than responsible growth (Kotler, 2011). Moreover, *'the reason that companies (and governments) are so prodigal with ecosystem services is that the value of those services doesn't appear on the business balance sheet'* (Lovins et al., 1999, p.146). However, in the same article, this argument is countered with the statement that the economy is actually embedded in the environment.

Within this study, environmentally sustainable businesses and products are used interchangeably. The argument made for the use of both comes from a straightforward rationale. When a product is an environmentally sustainable product, the company producing the product is engaging in some sort environmental sustainability. Therefore, further in the study when spoken about environmental sustainable businesses or products, one can assume that the product is sustainable, thus the company producing it can be considered as environmentally sustainable.

2.4 Adoption of sustainability

Moving on from the main concepts of the study at hand, it is important to understand and to know what drives adoption or refusal of sustainability-driven business models or product. Consumers play an important role for companies and marketers have already acknowledged the importance of emotional criteria. Furthermore, Kotler (2011) adds a dimension to this by claiming that consumers also give great importance to the social responsibilities of companies. Therefore, it is important to understand what drives consumers in adopting sustainability and what factors make them weigh sustainability more than regular companies.

To the best of the author's knowledge, no research has been done on the adoption of environmentally sustainable (or sustainability-driven) businesses and products as a whole. However, earlier research has focused on purchase intentions of specific categories of products such as green apparel (Cowan & Kinley, 2014; D'Souza, Taghian, Lamb, & Peretiatko, 2007), or the psychological factors influencing sustainable energy technologies acceptance (Huijts, Molin, & Steg, 2012). All of the aforementioned authors made use of the Theory of Planned Behaviour in order to investigate the consumers' behavioural intentions and adoption drivers. This theory will be further explained in chapter three.

The dependent variable in this study is adoption behaviour (of environmentally sustainable businesses and products). In order to properly measure the adoption of products, a clear definition about what adoption is needs to exist. However, before defining adoption, an important distinction needs to be made between intention to adopt and adoption. Intention adopt is the expressed desire to purchase or adopt a sustainable product in the near future. Intention is more about the consumer's state of mind afore adoption based on the perceptions and information on forehand. Adoption behaviour is about the actual purchase of a product or service (Arts, Frambach, & Bijmolt, 2011). Within this study adoption is defined as *´the behavioural act of*

choosing sustainable businesses instead of non-sustainable products.´ For adoption, the assumption has to be made that a behavioural intention can only become a behaviour when the behaviour is under control of the person acting and whether the person has the opportunity to decide at will whether to behave or not behave (Ajzen, 1991). This will be accounted for in the questionnaire through perceived behavioural control, which will be part of the hypothesized factors in chapter three.

Within this chapter, the main constructs relating to environmental sustainability were discussed. Moving on from this, in chapter three the main drivers for environmental sustainability adoption will be hypothesized.

Chapter three. Hypothesis development

After defining the main constructs supporting environmental sustainability in chapter two, this chapter focuses on the theory supporting environmental sustainability adoption. From this theory and with an extension, hypotheses will be drawn. The research largely builds upon and extends the Theory of Planned Behaviour (TPB). The TPB was originally created in 1985 and in the years thereafter further developed. The TPB is an extension of the Theory of Reasoned Action (Fishbein & Ajzen, 1975) , and is a theory which helps predicting human behaviour in terms of accepting and intention to purchase products. The TPB provides a conceptual framework which has been proven to predict human social behaviour with great accuracy (Ajzen, 1991; Cowan & Kinley, 2014; Huijts et al., 2012). Ajzen (1991) states in his theory that the model evaluates human social behaviour on three different levels of belief; behavioural-, normative-, and control beliefs. These beliefs are the underlying beliefs of respectively attitudes towards the behaviour, subjective norms with respect to the behaviour and perceived control over the behaviour. The three categories serve as a starting point for this research on environmental sustainability

adoption which is motivated by the fact that this theory is a well acknowledged and used theory (Armitage & Conner, 2001). The three belief categories will be described further below and hypotheses will be drawn from them. Afterwards the extension with moral obligation will be made.

3.1 Behavioural beliefs

The first type of beliefs is behavioural beliefs which results in a personal attitude towards a behaviour. These attitudes are considered to have a direct effect on the intention to behave, thus intention to adopt environmentally friendly products. Attitudes refer to the personal evaluation of whether the outcome of a behaviour is favourable or unfavourable to a person (Huijts et al., 2012). This personal evaluation is based upon four features; emotions, intentions, individual knowledge and positively instilled values (Ajzen, 1985). Cowan and Kinley (2014) divide the belief factors into environmental concern and environmental knowledge which together form an attitude and this line of reasoning is followed in this study

First of all, environmental concern has a positive influence on the willingness to behave environmentally friendly and therefore positively influences intention to adopt. Environmental concern is defined as '*the extent to which the consumer is worried about threats to the environment, the consequences of such threats for the harmony of nature and future generations, and the lack of human action to protect the environment for future generations'* (Abdul-Muhmin, 2007, p.238). The rationale of why high levels of environmental concern positively influences intention, is that when consumers are worried about environmental problems, they might sooner try to prevent them by purchasing sustainable products than when they have no concern. Environmental concern includes whether the environmental problems influence people's life directly, whether a government or country does enough about preventing it and mainly if it is the most important problem in society (Abdul-Muhmin, 2007; Cowan & Kinley, 2014).

Secondly, environmental knowledge is believed to be a contributor to attitudes (Hines, Hungerford, & Tomera, 1987). Looking at general green behaviour, research has shown that higher knowledge is a positive influencer of so called 'green behaviour', which could be recycling, but also the purchasing of environmentally friendly products (Connolly & Prothero, 2003). A similar situation is the case when looking at labels for sustainable clothing, where it is evident that clear labelling, thus better knowledge, leads to adopting green clothing and be more considerate in choosing for sustainable alternatives (Cowan & Kinley, 2014; D'Souza et al., 2007). Moreover, in a study of hydrogen fuel acceptance, experience, which in the study consists of amongst other knowledge of associated issues and education (thus, knowledge), is considered to be the main contributor to an attitude change needed for sustainable behaviour. (Schulte, Hart, & van der Vorst, 2004).

Aforementioned discussion on environmental concern and knowledge leads to the following two hypotheses related to behavioural beliefs, and thereby attitudes.

H1: Consumer's environmental concern is positively related to the intention to choose sustainable products over non-sustainable products.

H2: Consumer's environmental knowledge is positively related to the intention to choose sustainable products over non-sustainable products.

3.2 Normative beliefs

Normative beliefs, which are the basis for the subjective norm, are also considered to have a positive effect on the intention to adopt products. The subjective norm involves the likelihood that important individuals, or groups to whom individuals refer, approve or disapprove a certain behaviour (Ajzen, 1985). Cowan and Kinley (2014) more clearly define this process and describe it as social pressure to act in a certain way. Social groups have been found to influence the behaviour in different ways. For example close social groups, such as family and friends

influence more than distant social groups (Martin, 2010; Salazar, Oerlemans, & van Stroe-Biezen, 2013). Furthermore, even in situations where consumers have a positive attitude to environmental issues, a lack of strong social norms could prevent consumers to actually adopting sustainability (Ozaki, 2011).

Herd behaviour is considered as a separate driver in this study because it is of particular interest to know whether this kind of behaviour contributes to behavioural intentions. Herd behaviour is the act of basing your actions solely upon observed action of others, implying imitation. The difference with social norms and pressure is that herd behaviour is not only including the pressure element, but also sense of belonging by knowing or observing what your peers are doing (Salazar et al., 2013).

The discussion above leads to the following two hypotheses related to normative beliefs, and thereby subjective norms.

H3: Social pressure to environmental-friendly behaviour is positively related to the intention to choose sustainable products over non-sustainable products.

H4: Observing or knowing the choice of peers positively influences the choice of sustainable products over non-sustainable products

3.3 Control beliefs

Control beliefs is the antecedent of the construct Perceived Behavioural Control (PBC). PBC is the term which deals with the presence or absence of resources and opportunities. In this study, perceived behavioural control will be divided into different concepts. PBC is believed to give an accurate prediction of behaviour together with intention. There are two different, yet equally important, lines of reasoning behind this. First of all, if two people have equal intention, the person with most confidence in a positive outcome is more likely to succeed. The second

rationale is that a measure of perceived behavioural control is able to replace a measure of actual control. This is nevertheless only the case when the perceptions are realistic (Ajzen, 1991).

Past behaviour is the first construct within PBC to have a positive influence on behaviour. Abdul-Muhmin (2007) acknowledges the existing research in psychology about the efficacy of past behaviour to predict future behaviour. Past behaviour (or experience (Huijts et al., 2012)) has a direct effect on behaviour, and even in the case knowledge is not very high about a product, consumers might still rely on their previous experience with a product (Abdul-Muhmin, 2007; Cowan & Kinley, 2014; D'Souza et al., 2007).

The second concept within PBC is willingness to pay more for environmentally sustainable products or to support environmentally sustainable businesses. D'Souza et al. (2007) already questioned whether consumers are willing to pay more for green apparel. This relationship has been found to indeed be significant in the case of apparel (Cowan & Kinley, 2014), and one might argue that this is the case in for other product categories too. From another point of view, Martin (2010) found that consumers are more sensible to purchase environmentally friendly products when there are price promotions. This implies the same relationship that people are sensible to prices and when willing to pay more, behaviour is positively influenced.

The third and final aspect discussed as part of PBC is the role convenience plays in decision behaviour. In general innovation adoption theory, the role of convenience or complexity has a strong effect on behaviour (Arts et al., 2011). Ajzen (1991) describes perceived convenience as past behaviour, past experience, influences but also other factors that increase or reduce the perceived difficulty or performing the behaviour in question. The significance of the positive relationship between (perceived) convenience and behaviour has been consistently found

to be strong (Ajzen, 1991; Cowan & Kinley, 2014). This gives enough motivation to assume the positive relationship for this study.

The discussion above leads to the following three hypotheses related to behavioural beliefs, and thereby PBC.

H5: Previous decisions for sustainable products are positively related to the actual choice of sustainable products over non-sustainable products.

H6: Willingness to pay more for sustainable products is positively related to the actual choice of sustainable products over non-sustainable products.

H7: (Perceived) convenience to choose sustainable products is positively related to the actual choice of sustainable products over non-sustainable products

3.4 Moral obligation

In his discussion on the TPB, Ajzen (1991) suggests to add the role of moral obligation in order to predict human behaviour. Whereas Cowan & Kinley (2014) incorporate environmental guilt under the normative beliefs, in this study environmental guilt is taken as an independent construct. This is in line with Ajzen (1991), who sees moral obligation as influencing intentions in parallel with attitudes, norms and perceptions of behavioural control (Ajzen, 1991). The role of moral obligation has yet been tested in different settings, such as in the context of cheating on tests or exams where it found to add significant predictive power to the model. This study was based on a questionnaire, similar to the present study (Beck & Ajzen, 1991).

The reason for using environmental guilt interchangeably with moral obligation comes from the rationale that guilt is a determinant of moral obligation. Environmental guilt meets three conditions: the interests of society, the cost-benefits trade-off, and the rationality of environmental guilt (Lee & Holden, 1999). Despite the fact that cost-benefits more strongly relate

to PBC (Cowan & Kinley, 2014) , the rationality aspect lies more closely to personal norms, which is similar to moral obligation (Ajzen, 1991).

The discussion about environmental guilt and moral obligation leads to the following hypothesis.

H8: Personal feelings of moral obligation positively influence the intention to choose sustainable products over non-sustainable products

The discussion above and the eight hypotheses have been visualized in the conceptual model in Figure 1: Conceptual Model.

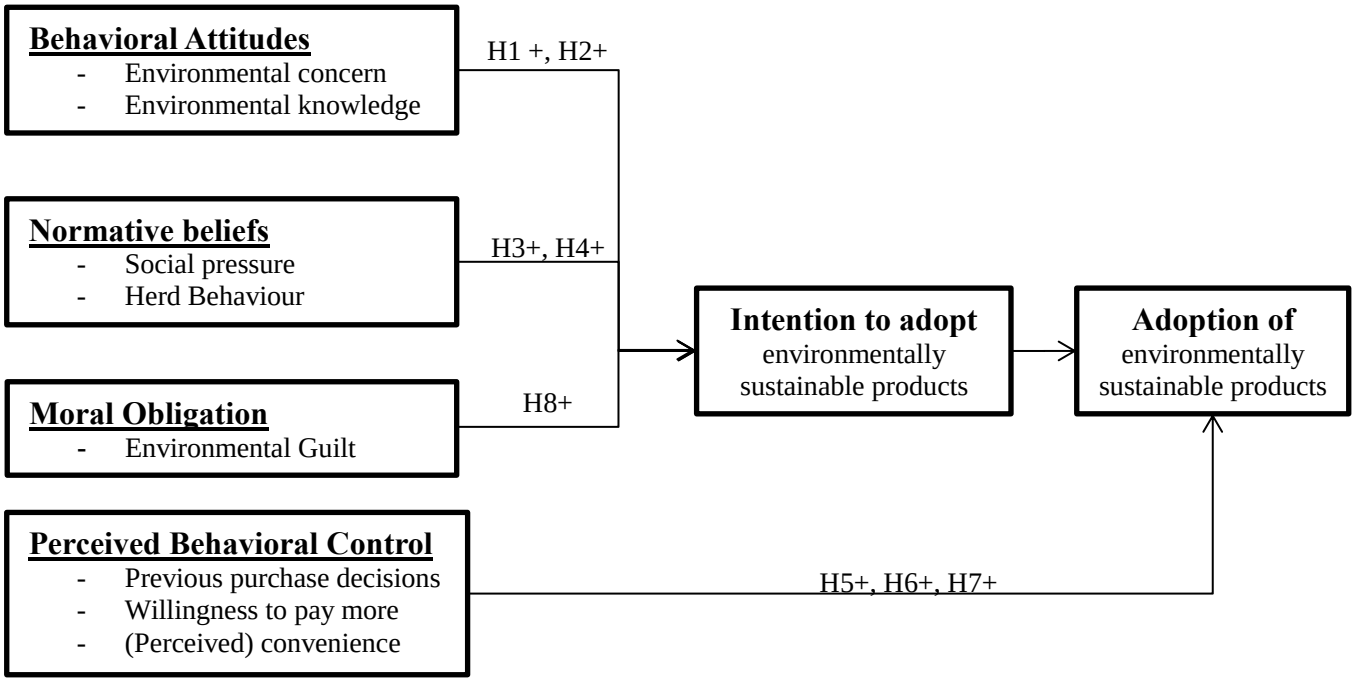

Figure 1: Conceptual model

Chapter four. Methodologies

This chapter contains an explanation of the research methodologies used in the study. It will focus on the context in which the data collection was done, the questionnaire development and related measures followed by the sampling and procedures.

4.1 Context

Blumberg, Cooper & Schindler (2011) identify four different types of research; reporting studies, descriptive studies, explanatory studies and predictive studies. This research can be classified under the explanatory studies. Explanatory studies aim to answer the 'why' and 'how' question. This research investigates why people make the decision to go for sustainable products rather than non-sustainable products; in other words, what drives them to do so. It offers an explanation of the act of adopting sustainable products. The reason for choosing this form of research is related to the state in which the sustainability research is at the moment.

Data collection for this research has been done through a web-based self-selected survey. This method was chosen, despite the fact that research about pro-environmental behaviour has been done extensively through behavioural experiments and proven to predict with great accuracy (Osbaldiston & Schott, 2012). This form of research has several advantages, such as cost-saving, and access to large quantities of otherwise inaccessible respondents. The aim of the survey is to provide justification to the eight hypotheses developed in the preceding chapter. Data-collection of this web-based survey was partially targeted and partially self-selected. Some respondents were e-mailed, whilst others encountered on social media.

The study was conducted amongst consumers in general. No discrimination was made between any sort of consumption behaviour or preference. The aim of the study was to gain an insight into the adoption drivers of consumers in general, rather than a subset of the population.

Also with regards to the type of products no actual discrimination was made. The aim was to investigate the adoption of each type of product. A distinction was made to identify differences between products that are purchased more frequently than others, and consequently analyses were done for each category.

4.2 Questionnaire development

Within this study, the web-based questionnaire that was created, consisted of six separate segments. In each segment a construct was divided into the different concepts, which were then questioned with multiple-item scales in most cases. These multiple-item scales were used to ensure a higher validity and reliability. In this study, when looking at the conceptual model as displayed on figure 1, page 18, a construct would be behavioural attitudes, which can be divided into the concepts environmental knowledge and environmental concern. All scales used in this study were rating scales. Rating scales are used to judge properties of object without any relationship to similar or other object (Blumberg et al., 2011). The majority of items were Likert scales, whilst the items previous purchase behaviour and intention to adopt were dichotomous. Items used in this questionnaire come from different authors and have been adapted to meet the context of the study. For a complete overview of the questionnaire content, please refer to appendix 1, table 3: survey items and Cronbach Alphas.

The first segment of the survey contained several questions about the demographics of participants. It contained questions about age, gender, nationality, educational level and profession. The second segment contained two questions about environmental concern and environmental knowledge. Environmental concern consisted of seven statements where participants were asked to rank their concern on a 7-point Likert scale from 1- strongly disagree to 7-strongly agree. Environmental knowledge was tested with six statements on which the

respondents had to rank their selves on a six point scale ranging from ‘nothing at all’ to ‘much more than the average person’, similar as in Abdul-Muhmin (2007).

After testing the environmental concern and knowledge of the respondents, some general insight was given into environmentally sustainable products because the upcoming questions would treat this subject. A selection of the text was *“…environmentally sustainable products are products which have been produced, grown or manufactured in harmony with the environment, or by a company that has environmental sustainability as a main focus point. (i.e. cradle to cradle, biological products, energy-saving equipment, etc.).”* After this introduction, a segment on normative beliefs follows which consists of social pressure and herd behaviour which have respectively five and six items. The items for social pressure are based on the research by George (2004) on internet purchasing behaviour, whilst herd behaviour was self-created due to the non-existence of tested scales. Both of these were answered on a 7-point Likert scale.

The fourth segment questioned Perceived Behavioural Control by asking three yes or no questions about previous purchase decisions, which comes from Cowan & Kinley (2014) but was extended to differentiate between different frequencies of purchasing behaviour. Furthermore a single item question was asked about willingness to pay more on a 5-point scale ranging from ‘up to 10%’ ‘more than 75%’ form Berger & Corbin (1992) . The third concept questioned was the (perceived) convenience with two items from Beck & Ajzen (1991), which was extended with three items from George (2004) to get a better insight. These items were answered on a 7-point Likert scale. Fifthly, environmental guilt (moral obligation) was added, following the recommendations of Ajzen (1991). However, the three items were taken from Beck & Ajzen (1991) and slightly reformulated and adapted to the situation. The sixth and last segment contained questions about the intention to adopt and adoption. Intention to adopt was originally unlikely – likely for one item and true-false on the other two items (Beck & Ajzen, 1991), but

adjusted to unlikely – likely for all three items. Adoption built upon the same product categories as previous purchase decisions and were answered on a 7-point Likert scale ranging from never to always. The type of behaviour in this study is self-reported expected behaviour.

4.3 Sampling procedures

The developed questionnaire was initially subject to a pre-test with N=10. After some minor changes, the questionnaire was activated on November 17, 2014. The test was initially published on the newsfeeds of Facebook, Twitter and LinkedIn. After publishing, the questionnaire got shared multiple times by friends and former colleagues of the researcher on the various social media platforms. Besides, the questionnaire was send via e-mail to roughly N=650 employees within a Dutch governmental institution and to about N=500 employees at a Dutch educational institution of high schools. One reminder was posted on the mentioned social media platforms and the questionnaire was closed on Monday November 24, 2014 after the aim of 250 respondents that completed the questionnaire was exceeded.

The sampling strategy described above of this thesis is a combination of convenience sampling and snowball sampling. The sampling can on the one hand be identified as convenience sampling because it uses informal and formal pools of friends and colleagues. Despite the argued unreliability of this type due to possible selection biases, it is argued to be suitable for master theses due to its low costs and easiness to conduct (Blumberg et al., 2011). On the other hand, one might also argue that the sampling strategy used for this research is a form of snowball sampling. Snowball sampling refers to the identification of an individual or a group, who then is used to identify others (Blumberg et al., 2011). During the data collection period, various people who received or saw the questionnaire appearing on their Facebook, LinkedIn or Twitter feed decided to share the questionnaire, and in sequence, the friends of the ‘sharers’ in some occasion also shared the questionnaire.

Chapter five. Data analysis

5.1 Descriptive statistics and data preparation

After importing the retrieved data from Qualtrics into IBM SPSS Statistics, the first step was removing the invalid responses. These invalid responses were uncompleted questionnaires and they were filtered out for analysis. Even though 415 people started the questionnaire, 257 finished it completely which gives a dropout rate of roughly 38%. After deleting the invalid responses, 257 valid responses were used for the data analysis. Of these 257 respondents, 53.3% were male and 46.7% female. The average age of the respondents was 44.4 years old, with the youngest respondent reported 15 years old and the oldest 88 years old. Looking at nationality, 91.8% are Dutch, and the remaining 8.2% is in order of frequency German, American, British, Portuguese and Belgian. Out of all, 44.4% finished a Bachelor's degree as highest level of education, 32.3% a Master degree, 19.1% only high school, 3.1% finished a PhD and 1,2% pre-school. The majority of the respondents was employed (65.8%), followed by students (19.1%) and the remaining were self-employed (8.6%) and unemployed (6.6%).

After analysing the demographics, Cronbach Alphas of the various variables were calculated. The Cronbach Alpha is used to verify if multiple items can form one scale together and if the questions actually measure what they should measure in terms of their validity (Gliem & Gliem, 2003). Moreover, SPSS gives an insight into whether items should be deleted afterwards to increase this validity. The Cronbach's alpha's can be found in appendix 1: survey items and Cronbach Alphas. After the respective scales were calculated, they indicated that not all items could be combined. For 'previous purchase behaviour' and 'intention to adopt', the Cronbach Alphas were .433 and .290. For the previous purchase behaviour variable, the decision was made to treat each product category equivalent to the three items individually. Therefore

analyses were done for products consumers buy almost daily, regularly and rarely. For the variable of intention, the variable was combined into one single item with the formula: *(intention1 – 1) * (intention3 – 1) * (2 – intention2).* Since 'intention2' is a reversed item, in this equation it is (2 – intention2). This approach was necessary to get the best possible results out of the intention variable and make it a stronger dependent variable. The formula ensures a greater spread in the responses and prevent a lack of variance in the responses. It also means that if a person answered in one out of three items he did not have an intention (the case for 14.4% of respondents); he was considered to not have intention at all. This dependent variable is dichotomous and therefore probit analysis will be used for the analysis in which intention to adopt is the dependent variable. For willingness to pay more, no Cronbach Alpha was calculated because it is a single-item scale. For an insight into the means and standard deviations please refer to appendix 2: table 4 Correlation and descriptive statistics. In this appendix, also the bivariate correlation table can be found. The correlation coefficients indicate low level of correlations, and all within the acceptable level.

Within the analyses, the dependent variable(s) adoption1, adoption2, and adoption3 refer to the frequencies of which people expect to buy products in the future and previous1, previous2 and previous3 to whether they have bought them in the past. There are three different categories of products which also correspond to the previous purchase decisions items. The first category is products people buy almost daily (i.e. food, drinks, coffee, etc.) and is labelled 'previous1' and 'adoption1' in the analyses. The second category are products consumers buy regularly, (i.e. clothing, washing detergent, alcoholic beverages, shampoo, etc.) labelled 'previous2' and 'adoption2'in the analyses. The third and last product category are products people rarely buy (i.e. furniture, washing machine, and other electronic equipment), labelled 'previous3' and 'adoption3'in the analyses.

The retrieved data was also tested for multicollinearity. Multicollinearity is the case when some or all of the independent variables are highly correlated (Blumberg et al., 2011). Collinearity statistics gave Variance Inflation Factors (VIF) in the range of 1.031 to 1.937. This result gives enough confidence to perform the regression analyses.

5.2 Hypothesis testing

After preparation of the data, the hypotheses were tested. The hypotheses in this study were tested with one probit regression, and various linear regressions analyses. In order to perform the regression analyses, multiple items had to be combined into one single item. The method of combining the multiple items was taking the average for each variable. This was done for all items, with the exception of the single-item of willingness to pay more, previous purchases, and the variables intention to adopt and adoption. This approach was justified by the Cronbach's Alphas which were above 0.7.

The first analysis was a probit regression which had to be conducted due to the dichotomous nature of the independent variable of intention to adopt. In order to perform the probit analysis, an extra variable was added with a constant of 1 which is added as the 'total observed' in the regression. A probit analysis measures the relationship between the strength of an independent variable on independent variable. This type is mainly used when the dichotomous dependent variable is thought to be influenced or caused by levels of some independent variables. The first probit regression analysis tested the effect of the independent variables environmental concern, environmental knowledge, social pressure, herd behaviour and environmental guilt on the intention to adopt environmental sustainability. These five variables represent the set of hypotheses 1, 2, 3, 4 and 8 of which only Hypothesis 1 was supported at the $p<0.01$ confidence level. Environmental knowledge did have a significant relationship to intention, but it was a negative, causing rejection of the hypothesis. The first set of hypotheses was tested and the

outcomes and respective significance levels can be found in table 1: results for hypotheses 1, 2, 3, 4, 8. For the supporting statistical outcomes of the analysis, please refer to appendix 3, table 5: Probit regression 1: hypothesis testing 1, 2, 3, 4, 8.

Table 1
Results for hypotheses 1, 2, 3, 4, 8

Hypothesis	Supported	Significance level
H1: Consumer's environmental concern is positively related to the intention to choose sustainable products over non-sustainable products.	Yes	.000
H2: Consumer's environmental knowledge is positively related to the intention to choose sustainable products over non-sustainable products.	No	.020*
H3: Social pressure to environmental-friendly behaviour is positively related to the intention to choose sustainable products over non-sustainable products.	No	.324
H4: Observing or knowing the choice of peers positively influences the choice of sustainable products over non-sustainable products.	No	.547
H8: Personal feelings of moral obligation positively influence the intention to choose sustainable products over non-sustainable products.	No	.307

Note. *Environmental knowledge is significant, but relationship is negative

The next three regressions tested the variables within perceived behavioural control, which are believed to influence adoption behaviour in parallel to intentions (Ajzen, 1991). ANOVA analysis for all of the following regressions show high significance of p=0.000 for all of the models. The variables corresponding to hypotheses 5, 6 and 7 (previous purchase behaviour, willingness to pay more and perceived convenience) were tested on each product category

questioned (products consumers buy almost daily, regularly and rarely). Previous purchase decisions were confirmed in each case at $p<0.001$. Willingness to pay more was confirmed at $p<0.001$ for products consumers buy almost daily, $p<0.1$ for products consumers buy regularly and rejected for consumers barely purchase. The seventh hypothesis was accepted for $p<0.01$ for all given product categories. The adjusted R^2 of the regressions on adoption behaviour were .421, .373 and .307, implying a low explanation of the variance in responses. Within each of these regressions, intention was included to investigate whether this can be seen as a predictor for behaviour. Only for category one, a moderate degree of significance was met ($p<0.1$). For an overview of the hypotheses please refer to table 2: hypotheses6, 7, 8. For an insight into the statistical outcomes of the three analyses, please refer to appendix 3, table 6: Regression 2: Hypothesis 5, 6, 7 – Adoption1, table 7: Regression 3: Hypothesis 5, 6, 7 – Adoption2 and table 8: Regression 4: Hypothesis 5, 6, 7 – Adoption3.

Table 2
Results for hypotheses 5, 6, 7

Hypothesis	Supported	Supported	Supported
	Adoption1	Adoption2	Adoption3
H5: Previous decisions for sustainable products are positively related to the actual choice of sustainable products over non-sustainable products.	Yes .000	Yes .000	Yes .000
H6: Willingness to pay more for sustainable products is positively related to the actual choice of sustainable products over non-sustainable products.	Yes .000	Yes .058	No .885
H7: (Perceived) convenience to choose sustainable products is positively related to the actual choice of sustainable products over non-sustainable products	Yes .000	Yes .004	Yes .006

One extra set of three regressions was done in threefold, because of the weakness of the variable intention to adopt. This set of regressions tested all of the independent variables directly on adoption behaviour. This gave significant positive relationships for environmental concern ($p<0.1$, $p<0.01$, $p<0.05$), environmental guilt ($p<0.01$, $p<0.01$, $p<0.01$) and previous purchases in all cases ($p<0.01$, $p<0.01$, $p<0.01$). For product category 1, also environmental knowledge ($p<0.01$) and social pressure ($p<0.05$), willingness to pay more ($p<0.05$) and perceived convenience ($p<0.05$) were significant. For category three, in addition to earlier mentioned variables, also willingness to pay more ($p<0.05$) was significant. For an insight into the statistical outcomes of the three analyses, please refer to appendix 3, table 9: Regression 5: All independent variables on Adoption1, table 10: Regression 6: All independent variables on Adoption2, table 11: Regression 7: All independent variables on Adoption3/

Chapter six. Discussion

The results mentioned in chapter five indicated that not all hypotheses were supported. Nevertheless, the data analysis gives valuable insights into what the main drivers are for the adoption of environmentally sustainable products. The results will be discussed in this chapter and possible reasons will be given for the hypotheses that were not supported.

The first hypothesis confirmed that environmental concern is a good predictor of the intention to adopt environmentally sustainable products. Respondents overall indicated to possess a strong concern (mean=5.5509) about the environment. Based upon this research, environmental concern is the strongest influencer of adoption ($p=0.000$). This implies that when consumers have a strong concern, which is determined by both concern in general but also if a country does enough to contribute (Abdul-Muhmin, 2007), they are more likely to have the intention to purchase environmentally sustainable products.

The first rejected hypothesis is hypothesis 2. Despite the relationship between environmental knowledge being significant, the coefficient is negative. This implies that environmental knowledge negatively influences the intention to adopt. One reason might be the relatively poor quality of intention to adopt variable. When looking at the direct effect on adoption for each product category, the relationship is indeed positive and significant. Another argument that might explain the negative effect is that knowledge was based upon how respondents perceived their knowledge in comparison to others. The mean (4.1342) suggests that in general, the consumers rank themselves as higher than the average person. This might be a form of overestimation, causing a negative relationship. It also means that people that rank themselves as lower than average, have a higher intention to adopt.

Social pressure (H3) and herd behaviour (H4) were both found to have no significant effect on the intention to adopt. This implies that consumers do not feel an urgency to behave in a pro-environmental way when they see others do it or when they are pressured into doing so. Both of these variables are far off from being significant. Even though the outcomes are different, Salazar et al (2013) indicate the potential drawback of soliciting instead of revealing preferences of consumers. This claim is also confirmed by Armitage and Conner (2001), who confirm more variance is explained when behaviour is observed. In a self-administered survey, respondents might be more tempted to respond in a social desirable way, which will be further explained in the limitations part of this study.

Contradicting to hypothesized, moral obligation (environmental guilt) in this study was also found to be insignificant. The respondents on average claimed that they did not feel guilty to purchase non-environmentally sustainable products, thus there was no sense of moral obligation. In the study by Cowan & Kinley (2014), environmental guilt was, although positive, also not the

strongest predictor of intentions. They argue that this is due to the fact that it is more likely that individuals are pressurized, instead of it being an intrinsic motivation.

The outcomes hereby discussed, in relation to earlier mentioned discussion, imply that the main predictor on the variable of intention is environmental concern. However, notion should be made of the fact that when environmental guilt was put into a regression directly to adoption, it was significant ($p<0.01$) for each of the product category. Although differing from the original conceptual model, this does give us some reason to believe that environmental guilt is actually influencing adoption behaviour. Also for the first category of products, environmental knowledge is significantly positive related to behaviour in each product category. Since the original hypothesized model did include intention, we cannot draw the conclusion that this is the actual case, but the limitations should be acknowledged.

When analysing the variables influencing adoption of environmentally sustainable products in parallel to intention, more confident conclusions can be drawn. First of all, the claim that previous behaviour is an excellent predictor of future behaviour (Ajzen, 1991) seems to be true. Consumers, who have purchased these kinds of products, might do so in the future. This could be because they have done it in the past, which was caused by their concern about environmental problems. The significance for this category is very high ($p<0.001$), meaning that in almost all of the cases, we can say that when people purchased before, they will do it again.

Nevertheless, hypothesis 6 (willingness to pay more) was not confirmed for all product categories. Where the outcomes differ from the hypotheses for perceived behavioural control, is within the willingness to pay more. The results indicate that the less frequent people buy products, the less influence willingness to pay more has. Whereas for products people buy almost daily (I.e. food, drinks, coffee, etc.) the significance $p<0.01$, for products consumers buy regularly, (i.e. clothing, washing detergent, alcoholic beverages, shampoo, etc), significance is only reached at

the $p<0.1$ level. For products people rarely buy (i.e. furniture, washing machine, and other electronic equipment), no significance is reached. This could be due to the frequency of which people buy products. For example for products consumers buy regularly, other factors influence the purchasing behaviour. People might have their preference for certain brands, or might simply not consider the role of sustainability as high in these product categories. They might justify their non-sustainable behaviour by claiming they don't do this regularly. Such preference count more for products people rarely buy,(i.e. furniture, washing machine, other electronic equipment). For furniture, one could imagine that aesthetics and personal taste weigh more, because you will need to use it for a long period.

The respondents to perceived convenience were generally confident that purchasing environmentally sustainable products was within their capabilities and control. The average respondent ranked their selves in between somewhat agree and strongly agree (mean=5.2043). The outcome and the high significance level for perceived convenience can be interpreted as that when people perceive the act of purchasing environmentally sustainable products is within control, they are more likely to purchase them an behave this way. There is a simple logic behind this; if consumers know where to find and how to purchase certain products, and they have a favourable attitude towards them (concern), they are simply more likely of doing it too. Thus, one might conclude that it is a combination of the two factors.

Overall, it can be concluded that the behavioural act of choosing and purchasing environmentally sustainable products over non-sustainable products is determined by four factors. First of all intention, which is mainly determined by environmental concern, has a significant influence on behaviour in the first category. Next to that there is a combination of previous purchases in all categories, willingness to pay more in the case of category one and two, and perceived convenience in all of the categories.

Chapter seven. Contributions

Regardless of the fact that only a selection of the hypotheses has been confirmed through this research, the study still provides insights which are valuable for the research community and management. In this chapter those implications will be discussed.

7.1 Scientific contributions

Several authors indicated the road for research, which this thesis follows. This research extends and contributes to a long line of sustainability research. This is done by focusing on the consumer-centric perspective rather than system changes on a macro-economic level. The necessity of the consumer perspective for example has been pointed out by Vlek and Steg (2007) who stated that the conditions needed for environmentally sustainable businesses to succeed is something in which research needs to be extended on a multidisciplinary level. More specifically it follows the recommendations of Kotler (2011), who pointed out that it was essential to investigate what factors lead consumers to give more weight to sustainability.

As van der Leeuw (2012) argued, problems with regards to the environment have their roots in human behaviour, and one way of investigating this is through application of the Theory of Planned Behaviour. This theory, which has been used in many different contexts is now applied to a new context; the concept of environmental sustainability. Where other authors have applied it to a specific sustainable product type (Cowan & Kinley, 2014), in this research a broader scope is taken to cover more products. This step is one that seems to be skipped in earlier research. Moreover, the Theory of Planned Behaviour is extended with moral obligation, as recommended by the author itself. Next to that, the different constructs are extended and divided into different concepts. This allows researchers in the future to get a better grasp of what factors to include and what to neglect when investigating the constructs.

This research also indicates that more elaborate research needs to be done on the drivers, and the concepts of which the constructs behavioural attitudes, normative beliefs and perceived behavioural control consist. Where it might have been sufficient in a more conventional context, the results indicate that for the context of sustainability there is more to intention to adopt than is given by authors so far.

7.2 Managerial implications

Besides the scientific contributions as discussed in the previous section, there are also several managerial implications. The foremost managerial implication is that consumers are more likely to purchase environmentally friendly products when they are concerned about the environment. Up until now, companies have not yet fully grasped how they should adjust their marketing efforts to manage the environmental imperative (Kotler, 2011). In order to properly cause the necessary switching behaviour to sustainable products amongst consumers, marketing efforts should primarily focus on communicating the necessity, causing concern amongst consumers. In parallel to the creation of concern, consumers need to feel that the ability to purchase the sustainable products is entirely within their control. When consumers have this perception, they are more likely to purchase sustainable products.

From the knowledge about concern, and the realization that social pressure or herd behaviour are no influencers, marketing efforts should primarily focus on creating concern through awareness campaigns (Sampei & Aoyagi-Usui, 2009). Considering herd behaviour, it would not benefit to have for example famous people as brand ambassadors or to pressure people into changing their behaviour. Also consumers need to be fully aware of where they are able to find the products, because this will help them to switch to the sustainable products (Cowan & Kinley, 2014).

Chapter eight. Limitations and future research

As in any other research, one must acknowledge the limitations of a study. Known biases and limitations were aimed to be minimized in order to retrieve reliable and generalizable results. The first limitation in this study is the relatively high dropout rate of the questionnaire. The 415 starting and 257 finishing respondent account for a dropout rate of 38%. When looking at this fact more detailed, the majority of the drop-outs did so after the first block of questions, which could be because a lack of interest, lack of knowledge about the topic or subjective experience of the questionnaire (Galesic, 2006).

The sampling methods used in this study led to a sample of respondents that have a high level of education in general. Of the respondents, 79.7% of the respondents have finished at least a bachelor's degree. This percentage is higher than the average within the Netherlands, which is about 40% (Ministerie van Onderwijs, 2013). This skewed sample might give a different perspective than the average consumer. Also the nationality of respondents (91.8% Dutch) can be seen as a limitation. Future research should aim to have a more balanced sample of different nationalities, which will also allow investigating the differences in drivers between countries.

A major limitation of the study at hand is the weakness of the variable 'intention to adopt'. This variable had, in contrast to the original items from Beck & Ajzen (1991) a weak Cronbach alpha and thus predicting value. For the sake of this study, the variable has been adjusted in order to ensure a greater spread in the responses and prevent a lack of variance in the responses. Nevertheless, future research should aim to have a better scale for this variable. This variable might also have influenced outcomes of the regression where this was the dependent variable, which was demonstrated with the analyses where the variable was left out of consideration.

The regressions in this study all have relatively low adjusted R^2 (up to .420). These low values mean that only a small amount of the variance is explained by the models in this study. Therefore, future research should try to build upon this research to investigate more drivers of environmental sustainability adoption. A suggestion could be the inclusion of certain shock reactions to the change, which has been researched for the system as a whole (Geels & Schot, 2007), but to the author's best knowledge not from a consumer's perspective.

Social desirability bias is a limitation of this research. Social desirability bias is more likely to occur in the case of questions about politics, religion, and environment, or personal issues (Grimm, 2010). Even though attempts were made to decrease this, such as guaranteeing anonymity and requesting the most honest responses, one cannot completely eliminate the risk of this bias. However, respondents might be prone to this bias because they want to profile themselves as performing the behaviour for proper intrinsic motivations (environmental concern), rather than social norms or herd behaviour. Whether it might be true or not, people might be reluctant to confirm herd behaviour as a driver for their behaviour.

Chapter nine. Conclusion

The study presented by means of this master thesis aimed to investigate what drives the adoption of environmentally sustainable businesses or products. This research direction is essential if companies want to be able to properly manage the environmental imperative (Kotler, 2011). The research started off by describing the antecedents of environmental sustainability. Environmental sustainability finds its roots in business responsibilities and corporate social responsibilities (Carroll, 1999). Within this study, environmental sustainability was described as the maintenance of natural capital (Goodland, 1995). A sustainable product is one that is produced in harmony with nature and has this maintenance of natural capital as part of their strategy.

In order to properly determine what drives the behavioural act of choosing sustainable products over non-sustainable products, the Theory of Planned Behaviour was used. The theory was extended with moral obligation in order to predict behaviour with greater accuracy. Besides moral obligation, which was not found to be significant for predicting intentions, only one variable was found to predict intention; environmental concern. Together with intention to adopt, previous purchases, willingness to pay more and perceived all were found to be significant. A total of eight hypotheses were created of which four were confirmed.

The gap this research filled was the missing application of the Theory of Planned Behaviour to a general context of environmental sustainability. The managerial implication that comes with the outcomes of the research are that marketing efforts should primarily focus on creating concern amongst consumers, and that pressuring of some sort is not the road to pursue. In addition, consumers need to know where to find and how to purchase the sustainable products instead of non-sustainable products (perceived convenience). When they are aware of how to do it, they are more likely to engage with it.

As in any other study, this research also had limitations that must be acknowledged. The main limitation was the weakness of the variable intention, which had a low Cronbach's alpha and had to be adjusted after data collection. Nevertheless, the respondents in the sample were educated more than average, and the majority of respondents were Dutch. Future research should aim to add more influencing factors, since the adjusted R^2 were quite low on average. Ultimately, one must acknowledge the risk of social desirability bias with this form of research.

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Appendices

Appendix 1: Survey items and Cronbach Alphas

Table 3
Survey items and Cronbach Alphas

Concept & Author	Items	Scale	Cronbach Alpha
	What is your age?		N/A
	What is your gender?		N/A
	What is your nationality		N/A
	What is the highest level of education you completed?		N/A
	What is your current profession?		N/A
Environmental Concern (Abdul-Muhmin, 2007) (6) (George, 2004)(1)	- The environment is one of the most important issues facing the world today - Issues relating to the environment are very important to me - The increasing destruction of the environment is a serious problem - We are not doing enough in this country to protect the environment - It is important for me that we try to protect our environment for future generations - We should devote some part of our national resources to environmental protection - Environmental problems are affecting my life personally	Likert Scale: Strongly Disagree - Strongly agree (1-7)	.889
Environmental Knowledge (Abdul-Muhmin, 2007)	- Global warming - Depletion of the ozone layer - Effects of oil spills on marine life - Depleted uranium from military ammunitions - Endangered plant and animal species - Destruction of the rainforests	Likert Scale: 1- Nothing at all 6- Much more than the average person(1-6)	.854
Social Pressure (George, 2004)	- People who influence my behavior think that I should buy sustainable products. - People who are important to me think that I should buy sustainable products. - My friends and family think that I should buy sustainable products - Generally speaking, I want to do what my friends and family think I should do - The people I work or study with think that I should buy sustainable products - Generally speaking, I want to do what my colleagues or fellow students thinks I should do	Likert Scale: Strongly Disagree Strongly agree (1-7)	.881

Herd Behaviour Self-developed	- I would be more likely to purchase environmentally sustainable products if I saw my friends or family purchase them - I would be more likely to purchase environmentally sustainable products if I saw famous people purchase them - I would be more likely to purchase environmentally sustainable products if I saw the people I work/study with purchase them Purchasing environmentally sustainable products give me a sense of belonging - I would be encouraged to purchase environmentally sustainable products if I saw a large group of people purchasing them	Likert Scale: Strongly Disagree Strongly agree (1-7)	.880
Previous Purchase (Cowan & Kinley, 2014)	- Products you buy almost daily (Food, drinks, coffee, etc.) - Products you buy regularly (clothing, washing detergent, alcoholic beverages, shampoo, etc.) - Products you rarely purchase (furniture, washing machine, other electronic equipment, etc.)	Dichotomous: Yes-No	.433 (treated as separate)
Willingness to pay more (Berger & Corbin, 1992)	- How much more would you be willing to pay for environmentally sustainable products?	5-point Likert scale 1- Up to 10% 5 - and more than 75%	N/A
Perceived Convenience (George, 2004) (3) (Beck & Ajzen, 1991) (1)	- I am capable of purchasing environmentally sustainable products - Buying environmentally sustainable products is entirely within my control - I have the resources, ability and knowledge to decide between sustainable and non-sustainable products - I can imagine a situation in which I choose environmentally sustainable products even if I did not plan it.	Likert Scale: Strongly Disagree Strongly agree (1-7)	.752
Environmental Guilt (Beck & Ajzen, 1991)	- I would feel guilty if I purchase non-environmentally sustainable products - Purchasing non-sustainable products goes against my principles. - It would be morally wrong for me to not buy environmentally sustainable products	Likert Scale: Strongly Disagree Strongly agree (1-7)	.889
Intention (Beck & Ajzen, 1991)	- If I had the opportunity, I would buy environmentally sustainable products - I would never purchase environmentally sustainable products - I may purchase environmentally friendly products	Dichotomous Unlikely-Likely	.290 (Adjusted)
Adoption Self-developed	- Products you buy almost daily (Food, drinks, coffee, etc.) - Products you buy regularly (clothing, washing detergent, alcoholic beverages, shampoo, etc.) - Products you rarely purchase (furniture, washing machine, other electronic equipment, etc.)	Likert Scale: Never-Always (1-7)	.732 (treated as separate)

Appendix 2: Correlation and descriptive statistics

Table 4

Correlation and descriptive statistics

	1	2	3	4	5	6a	6b	6c	7	8	9	10a	10b	10c	Mean	St. dev.
1. Environmental concern	1														5.5509	.90490
2. Environmental knowledge	.353**	1													4.1342	.61822
3. Social pressure	.380**	.126*	1												3.7367	1.10792
4. Herd behaviour	.307**	.059	.524**	1											3.8249	1.20843
5. Environmental guilt	.563**	.309**	.425**	.346**	1										3.7458	1.40783
6a. Previous1	.381**	.052	.256**	.108	.309**	1									1.7743	.41885
6b. Previous2	.159*	.070	.136*	.029	.265**	.343**	1								1.4358	.49683
6c. Previous3	.179**	.091	.228**	.148*	.300**	.131*	.146*	1							1.6342	.48258
7. Willingness	.310**	.226**	.185**	.136*	.440**	.210**	.232**	.046	1						1.71	.803
8. Perceived convenience	.338**	.179**	.178**	.045	.283**	.204**	.194**	.153*	.165**	1					5.2043	.89465
9. Intention	.390**	.002	.115	.106	.223**	.229**	.070	.103	.113	.150*	1				.8560	.35174
10a. Adoption1	.507**	.270**	.379**	.197**	.531**	.552**	.372**	.113	.384**	.346**	.249**	1			4.84	1.076
10b. Adoption2	.403**	.198**	.281**	.197**	.473**	.229**	.581**	.198**	.253**	.280**	.149*	.618**	1		4.16	1.120
10c. Adoption3	.361**	.214**	.193**	.190**	.411**	.077	.205**	.539**	.062	.237**	.134*	.322**	.500**	1	4.50	1.199

Note. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Appendix 3: Regression analyses

Table 5

Probit regression 1: hypothesis testing 1, 2, 3, 4, 8

Parameter	Estimate	Std. Error	Z	Sig.	95% confidence interval	
					Lower bound	Upper Bound
Environmental concern	.721	.152	4.758	.000	.424	1.018
Environmental knowledge	-.446	.192	-2.325	.020	-.822	-.070
Social pressure	-.114	.116	-.985	.324	-.341	.113
Herd behaviour	-.067	.111	-.602	.547	-.286	.151
Environmental guilt	.102	.100	1.022	.307	-.093	.297
Intercept	-.619	.821	-.754	.451	-1.440	.202

Note. PROBIT model: PROBIT(p) = Intercept + BX

Pearson Goodness-of-Fit Test
Chi-Square: 337.519
Df: 251
Sig. .000

Table 6

Regression 2: Hypothesis 5,6,7 – Adoption1

	Unstandardized coefficients		Standardized coefficients	t	sig	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.771	.346		2.226	.027		
Intention	.274	.151	.090	1.821	.070	.933	1.071
Previous1	1.126	.129	.438	8.706	.000	.892	1.121
Willingness	.333	.066	.249	5.066	.000	.938	1.067
Perceived convenience	.243	.059	.202	4.112	.000	.933	1.072

Note. Dependent Variable: Adoption1

Model Statistics:
Adjusted R^2: .421
ANOVA Significance .000

Table 7

Regression 3: Hypothesis 5,6,7 – Adoption2

	Unstandardized coefficients		Standardized coefficients	t	sig	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.040	.354		2.936	.004		
Intention	.252	.160	.079	1.571	.117	.969	1.032
Previous2	1.179	.116	.523	10.137	.000	.921	1.086
Willingness	.137	.072	.098	1.902	.058	.925	1.081
Perceived convenience	.189	.064	.151	2.939	.004	.931	1.074

Note. Dependent Variable: Adoption2

Model Statistics:
Adjusted R^2: .373
ANOVA Significance .000

Table 8

Regression 4: Hypothesis 5,6,7 – Adoption3

	Unstandardized coefficients		Standardized coefficients	t	sig	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.201	.414		2.897	.004		
Intention	.198	.181	.058	1.095	.274	.963	1.038
Previous3	1.266	.131	.510	9.645	.000	.970	1.031
Willingness	.011	.079	.008	.145	.885	.965	1.037
Perceived convenience	.200	.072	.149	2.771	.006	.938	1.067

Note. Dependent Variable: Adoption3

Model Statistics:
Adjusted R^2: .307
ANOVA Significance .000

Table 9

Regression 5: All independent variables on Adoption1

	Unstandardized coefficients		Standardized coefficients	t	sig	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-.112	.456		-.246	.806		
Environmental concern	.130	.071	.109	1.839	.067	.553	1.807
Environmental knowledge	.151	.084	.087	1.789	.075	.829	1.206
Social pressure	.119	.054	.123	2.212	.028	.632	1.583
Herd behaviour	-.034	.047	-.038	-.716	.474	.685	1.461
Environmental guilt	.153	.046	.200	3.328	.001	.538	1.859
Previous1	.939	.126	.366	7.444	.000	.807	1.240
Willingness	.172	.067	.129	2.591	.010	.789	1.267
Perceived convenience	.146	.057	.121	2.543	.012	.855	1.170

Note. Dependent Variable: Adoption1

Model Statistics:
Adjusted R^2: .502
ANOVA Significance .000

Table 10

Regression 6: All independent variables on Adoption2

	Unstandardized coefficients		Standardized coefficients	t	sig	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.020	.486		.042	.967		
Environmental concern	.193	.074	.156	2.617	.009	.590	1.696
Environmental knowledge	.058	.090	.032	.637	.525	.841	1.189
Social pressure	.033	.058	.033	.576	.565	.640	1.563
Herd behaviour	.041	.051	.044	.793	.428	.686	1.458
Environmental guilt	.170	.050	.213	3.388	.001	.529	1.889
Previous2	1.096	.109	.486	10.023	.000	.891	1.122
Willingness	-.044	.072	-.032	-.610	.542	.780	1.282
Perceived convenience	.081	.062	.064	1.294	.197	.846	1.182

Note. Dependent Variable: Adoption2

Model Statistics:
Adjusted R^2: .463
ANOVA Significance .000

Table 11

Regression 7: All independent variables on Adoption3

	Unstandardized coefficients		Standardized coefficients	t	sig	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.176	.560		.314	.754		
Environmental concern	.218	.084	.165	2.586	.010	.589	1.696
Environmental knowledge	.139	.103	.072	1.346	.179	.843	1.187
Social pressure	-.100	.066	-.092	-1.500	.135	.635	1.574
Herd behaviour	.056	.058	.056	.955	.341	.690	1.449
Environmental guilt	.184	.058	.216	3.177	.002	.516	1.937
Previous3	1.106	.129	.445	8.546	.000	.884	1.132
Willingness	-.184	.082	-.123	-2.231	.027	.785	1.273
Perceived convenience	.098	.071	.073	1.380	.169	.854	1.171

Note. Dependent Variable: Adoption3

Model Statistics:
Adjusted R^2: .387
ANOVA Significance .000